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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
08/994,038	12/18/97	YAMAZAKI	S 07977/208001

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MM42/0721

EXAMINER

COLEMAN, W

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 07/21/99

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

# Office Action Summary

Application No.  
**08/994,038**

Applicant(s)  
**Shunpei Yamazaki, Satoshi Teramoto**

Examiner  
**William David Coleman**

Group Art Unit  
**2823**



☒ Responsive to communication(s) filed on May 6, 1999

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

## Disposition of Claims

☒ Claim(s) 1-23 is/are pending in the application.

Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

☐ Claim(s) \_\_\_\_\_ is/are allowed.

☒ Claim(s) 1-23 is/are rejected.

☐ Claim(s) \_\_\_\_\_ is/are objected to.

☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☒ All ☐ Some\* ☐ None of the CERTIFIED copies of the priority documents have been

☒ received.

☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 5

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments with respect to claims 1-6 and 11-14 have been considered but are moot in view of the new ground(s) of rejection.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-6 and 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki U.S. Patent 5,824,235 in view of Zhang et al. U.S. Patent 5,569,936 and Zhang et al. U.S. Patent 5,481,121.

Yamazaki (235) discloses a semiconductor device substantially as claimed. See figure 8A, also see column 8, lines 60-68, where the device is called a digital steel camera or an electron camera. The device has a function of saving an image photographed with CCD camera electronically. However, Yamazaki (235) fails to disclose a semiconductor film having any particular crystal structure. Zhang (936) discloses a semiconductor device with crystal structure to increase

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electron mobility and increased efficiency with catalytic material such as iron (Fe), cobalt (Co), and Platinum (Pt). In view of Zhang (936) it would have been obvious to incorporate other catalyst material, including iron, cobalt and platinum as claimed in Yamazaki (235) for increased electron mobility and increased efficiency.

Yamazaki (235) fails to particularly disclosed the structure of rod-like or columnar crystallized material. Zhang (121) discloses a semiconductor device structure with columnar crystallized material fabricated in a lateral direction. When, after an amorphous silicon film is formed at first on a glass substrate, a mechanism of crystallizing the film by heating is studied through experiments; it is recognized that the crystal growth begins from the interface between the glass substrate and the amorphous silicon and it proceeds in a columnar shape in vertical to the surface of the substrate (column 2, lines 29-36). The crystal grows in the lateral direction parallel to the substrate **101** as shown in **FIG. 2B**. In view of Zhang (121) it would have been obvious to incorporate the predetermine direction of the crystal growth in the Yamazaki (235) semiconductor device for improved semiconductor devices.

4. Claims 16 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. U.S. Patent 5,604,360 in view of Mizutani et al. U.S. Patent 5,043,785.

Zhang (360) discloses a semiconductor device substantially as claimed. See **FIGS. 2A-2D**. **FIG. 1** is a top plan view showing a construction of a liquid crystal display of the embodiment of the present invention in outline, wherein a picture element section **10** having a plurality of picture element electrodes provided in matrix (not shown) and a peripheral circuit **20** as a driving circuit

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for driving each of the picture element electrodes are shown. A silicon oxide base film 102 is formed on a glass substrate, an amorphous silicon film 104 is arranged on top of silicon oxide 102. Crystal grows in a lateral direction (direction parallel to the substrate) from the region 100 as shown by arrow 105 in the peripheral region of the region 100. However, Zhang (360) fails to disclose a MOS capacitor for charge transfer. Mizutani (785) discloses a semiconductor device with a MOS capacitor. See FIGS. 3 and 4, an n-type semiconductor film 2 is doped with boron to simultaneously form P+ areas within a sensor area 4, source and drain areas 14, 24 and a MOS capacitance area 34. Then, after the formation of gate insulator films, a gate 16 of the MOS capacitance and a gate 6 of the MOSFET are formed. In view of Mizutani (785) it would have been obvious to incorporate a MOS capacitor in the Zhang (360) semiconductor device for photoelectric conversion.

5. Claims 17, 18 and 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. U.S. Patent 5,604,360 in view of Mizutani et al. U.S. Patent 5,043,785.

Zhang (360) discloses a semiconductor device substantially as claimed as discussed in claims 16 and 19 above. However, Zhang (360) does not disclose a quartz substrate or image sensor.


Mizutani (785) discloses a quartz substrate. In FIG. 1, a thin semiconductor film 2 of n-type or I-type is formed on a substrate 1. The substrate 1 is composed of a transparent substrate such as quartz if the device receives the light through the substrate. In view of Mizutani (785) it would have been obvious to incorporate quartz substrate in the Zhang (360) semiconductor device for use as an image sensor.

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6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to W. David Coleman whose telephone number is (703) 305-0004. The examiner can normally be reached on Monday-Friday from 9:00 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached on (703) 308-4918. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

  
Donald L. Monin, Jr.  
Primary Examiner